All hosted Bluetooth application can benefit from the unique features of the KC2680A. The low power and small form factor attributes of the KC2680A are ideal for the following applications

- **Bluetooth Modules**

- **Personal Computers**

- **PC Add-ons** (USB dongles, PC cards, etc.)

- **PDAs**

- **Mobile Phones**

- **Printers**

- **Digital Cameras**

- **Access Points and Gateways**

Overview

KC2680A is an advanced Bluetooth controller that provides full Baseband functionality to form a complete Bluetooth system. Based on the famed µ**PAX** architecture, KC2680A offers a compelling value proposition of low power consumption, optimal performance and integration flexibility to any Bluetooth system designs. KC2680A incorporates all the layers of the Bluetooth Stack from the RF transceiver to the Host Controller Interface (HCI) in a single package, including Radio Interface (RI), Link Controller (LC), Link Manager (LM), and HCI transports.

KC2680A contains an 8-bit embedded CPU, on-chip RAM (8KB) and ROM (32KB), a protocol process engine, standard peripheral bus interface of both USB and UART, a PCM interface for audio applications and a programmable RF interface for Bluetooth radios. The µPAX architecture allows the KC2680A to process the Bluetooth protocol with only an 8-bit processor running at low speed and its unique memory management scheme allows the formation of multi-point Piconet with minimum memory requirement. The USB interface operates at full speed (12 Mbps) and it contains 6 endpoints to accommodate simultaneous voice and data. The 4-wire high-speed UART interface uses RTS and CTS for flow control and supports speeds up to 921 Kbps. The KC2680A contains a hardware CVSD transcoder for voice applications the PCM interface supports many types of external audio codec including linear, A-Law, and µ-Law. The KC2680A uses a unique programmable radio-baseband interface – Versatile Radio Extension (**VRX**). Through VRX, KC2680A is able to work seamlessly with radio chips or modules that supports various standard and proprietary interface types.

Features

- Bluetooth 1.1 compliant
- USB 2.0 full-speed compliant
- Supports all ACL and SCO packet types
- Maximum 723 Kbps data transfer rate
- Full 7-slave Piconet and Scatternet operation
- Supports Master-Slave Switch
- Supports Park, Hold, and Sniff power saving modes
- Built-in hardware CVSD transcoder
- Supports external Linear, A-Law, and µ-Law audio codecs

- Supports BlueRF RXMode2/3 radio interface
- USB interface at 12 Mbps
- UART interface from 2.4 Kbps to 921 Kbps
- 1.8V core with 1.8V – 3.3V I/O
- Manufactured in 0.18 µm process technology
- BQB qualified Bluetooth component
- USBIF listed USB component
- Available in
  - 7x7x1.0 (mm) 64-ball VFBGA – KC2680A
  - 5x5x1.0 (mm) 64-ball VFBGA – KC2680AP

Innovative Architecture
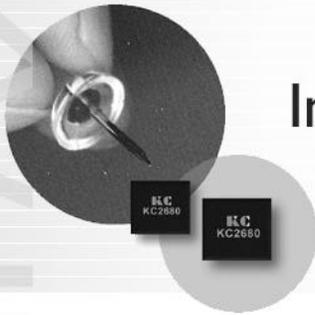
µPAX (Micro Protocol Accelerator) is a unique processor independent architecture that brings features and values to a Bluetooth Baseband controller. A dedicated hardware accelerator takes away the most timing critical tasks from the CPU, reducing both the peak and average CPU load, thus allowing the usage of a much less powerful CPU to process the Bluetooth protocol. Not only would this help to reduce power consumption, program memory (ROM/Flash) and overall gate count (chip size) can also be reduced. For typical hosted Bluetooth applications, µPAX requires only an 8-bit CPU running at 8 MHz with 32K bytes of program memory to process the full-featured Bluetooth Stack up to the HCI level. With a proprietary buffering and memory management scheme that is patent pending, µPAX saves RAM space too. For the same typical hosted Bluetooth implementation, only 8K bytes of RAM is needed to form a full 7-slave piconet that supports concurrent ACL and SCO traffic. Besides power and cost savings, mPAX adds a unique feature of programmable Baseband-RF interface to the standard Bluetooth Protocol Stack. The Versatile Radio Extension (VRX) that gives mPAX this unique flexibility is a fully programmable interface that can support radio chips that are BlueRF RXMode2 and RXMode3, as well as few proprietary schemes. Through VRX, module manufactures can pick and choose different CMOS or BiCMOS radios to work with a single baseband. This gives them unprecedented flexibility to offer various Bluetooth modules at different performance and price point all from a single known baseband source. The programming of VRX is easy; all configuration parameters can be stored in a small block of memory on an EEPROM or through run-time host download. With the benefits of power, cost savings and unique flexibility, mPAX brings value, differentiation, and the most important of all, competitive advantage to any Bluetooth-enabled device.
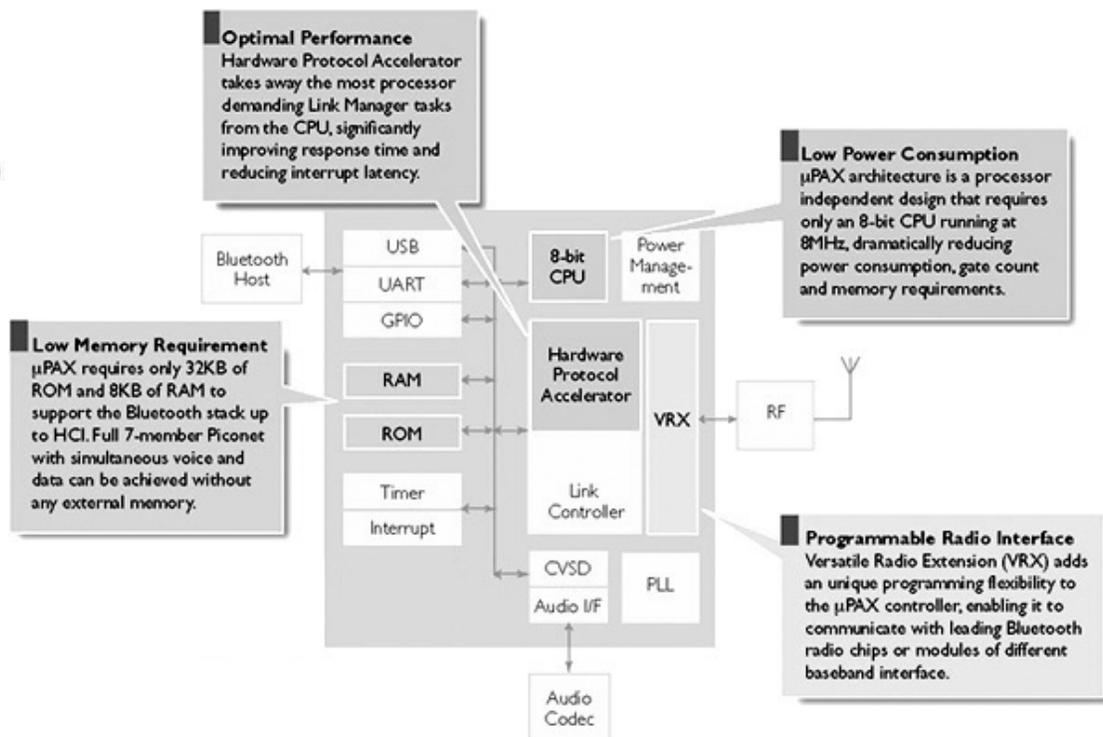
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Optimal Performance
Hardware Protocol Accelerator takes away the most processor demanding Link Manager tasks from the CPU, significantly improving response time and reducing interrupt latency.

Low Power Consumption
µPAX architecture is a processor independent design that requires only an 8-bit CPU running at 8MHz, dramatically reducing power consumption, gate count and memory requirements.

Low Memory Requirement
µPAX requires only 32KB of ROM and 8KB of RAM to support the Bluetooth stack up to HCI. Full 7-member Piconet with simultaneous voice and data can be achieved without any external memory.

Programmable Radio Interface
Versatile Radio Extension (VRX) adds an unique programming flexibility to the µPAX controller, enabling it to communicate with leading Bluetooth radio chips or modules of different baseband interface.

Block diagram labels: Bluetooth Host, USB, UART, GPIO, 8-bit CPU, Power Management, RAM, ROM, Hardware Protocol Accelerator, VRX, RF, Timer, Interrupt, Link Controller, CVSD, Audio I/F, PLL, Audio Codec.

Bluetooth™